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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/763,365	02/23/2001	Teruo Takizawa	108680	4673

7590 02/21/2002
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P O Box 19928
Alexandria, VA 22320

EXAMINER

HOGANS, DAVID L

ART UNIT PAPER NUMBER

2813

DATE MAILED: 02/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/763,365	TAKIZAWA ET AL.	
	Examiner	Art Unit	
	David L. Hogans	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 8-13 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>7</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Traversal of Restriction

Per your January 3, 2002, response to restriction requirement. Examiner maintains these inventions are distinct because they have acquired a separate status within the art. As proof of this, the December 4, 2001, Election/Restriction Detailed Action cited different classifications for the claimed inventions. Therefore, since the different classifications provides an undue examining burden upon the Examiner, the Restriction Requirement is made final.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1, 2 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by 5,101,247 to Ozturk et al.

In reference to Claim 1, Ozturk et al. teaches:

- a semiconductor device comprising: a silicon substrate, a MOSFET formed on the silicon substrate and a gate electrode of the transistor comprised by a germanium film (26). (See Figures 1, 2 and 3; column 7 lines 20-68)

In reference to claim 2, Ozturk et al. teaches:

- a germanium film comprised by a polycrystalline germanium film (See column 4 lines 3-32; column 5 lines 52-60, column 6 lines 40-66)

In reference to claim 4, Ozturk et al. teaches:

- a multi-layer gate electrode with a low resistance conductive film (33) (See Figure 3; column 7 lines 20-68)

3. Claims 1, 3, 4, 7 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by 5,216,271 to Takagi et al.

In reference to Claim 1, Takagi et al. teaches:

- a semiconductor device comprising: a silicon substrate, a MOSFET formed on the silicon substrate and a gate electrode of the transistor comprised by a germanium film (8). (See Figure 1A; columns 2-3 lines 58-07)

In reference to Claim 3, Takagi et al. teaches:

- p-type impurities doped into said germanium film (See Figure 1A; columns 2-3 lines 58-07)

In reference to claim 4, Takagi et al. teaches:

- a multi-layered gate electrode with a low resistance conductive film (10) (See Figure 1A: columns 2-3 lines 58-07)

In reference to claim 7, Takagi et al. teaches:

- a n-channel MOSFET and a p-channel MOSFET wherein a gate electrode of each MOSFET is comprised by a polysilicon germanium film (25 or 31) in which p-type impurities are doped (See Figures 2 and 3A to 3E, columns 4-5 lines 37-42)

In reference to Claim 14, Takagi et al. teaches:

- p-type impurities doped into said germanium film (See Figure 1A, column 2-3 lines 58-07)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over 5,101,247 to Ozturk et al. in view of 5,608,249 to Gonzalez.

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In reference to claim 5, Ozturk et al. teaches, a semiconductor device comprising a silicon substrate, a MOSFET formed on the silicon substrate and a gate electrode of the transistor comprised by a germanium film (26). (See Figures 1, 2 and 3; column 7 lines 20-68) Furthermore, Ozturk et al. teaches a multi-layer gate electrode with a low resistance conductive film (33). (See Figure 3; column 7 lines 20-68)

Ozturk et al. fails to explicitly teach that the low resistance conductive film is comprised by a transition metal, a transition metal silicide, or a transition metal nitride film, or a combination thereof.

However, Gonzalez, in Figure 4 and column 6 lines 6-17, discloses the concept of a low resistance conductive film (41) comprised by a transition metal silicide or a transition metal nitride film.

It would have been obvious to one of ordinary skill in the art to modify Ozturk et al.'s teachings via Gonzalez's teaching of a low resistance conductive film comprised by a transition metal silicide or a transition metal nitride film. Ozturk et al.'s modification via Gonzalez's teachings is obvious because this is a well known way to make ohmic contacts. Therefore, it would be well known to apply this conductive film composition to a Germanium layer.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over 5,216,271 to Takagi et al. in view of 5,227,333 to Shepard.

In reference to claim 6, Takagi et al. teaches, a semiconductor device comprising a silicon substrate, a MOSFET formed on the silicon substrate and a gate electrode of the transistor comprised of a germanium film (8). (See Figures 1A; columns 2-3 lines 58-07) Furthermore, Takagi et al. teaches a multi-layer gate electrode with a low resistance conductive film (10). (See Figure 1A; columns 2-3 lines 58-07)

Takagi et al. fails to explicitly teach a multi- layer structure with a polysilicon layer in between a germanium layer and a conductive layer.

However, Shepard, in Figure 6 and columns 4-5 lines 65-10, discloses the concept of a multi- layer structure with a polysilicon layer (76') in between a germanium layer (74') and a conductive layer (76').

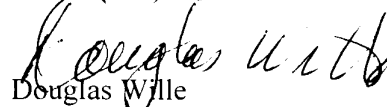
It would have been obvious to one of ordinary skill in the art to modify Takagi et al.'s teachings via Shepards teaching of a multi- layer structure with a polysilicon layer in between a germanium layer and a conductive layer. Takagi et al.'s modification via Shepards teachings is obvious because silicide layers are known to provide low resistance contacts. Therefore, it would be well known to apply this conductive film composition (polysilicon and metal) to a Germanium layer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (703) 305-3361. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.


Douglas Wille
Patent Examiner

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February 11, 2002